AMSCO
Ash Management Systems

September 2, 2008

Chad A. Stobbe
Land Quality Bureau
Iowa Department of Natural Resources
Wallace State Office Building
502 East 9th Street
Des Moines, IA 50319-0034

Re: Proposed Amendments to 567 IAC Chapter 108

Dear Mr. Stobbe:

Please consider the following comments and suggestions regarding the Department's proposal to amend chapter 567 IAC 108, "*Beneficial Use Determinations: Solid By-Products As Resources and Alternative Cover Material*".

AMSCO, Incorporated is an Iowa corporation. Its home office is located in Davenport. Since 1993, AMSCO has been authorized by the Iowa Department of Natural Resources (DNR) to utilize coal combustion by-products (CCB) provided by numerous companies to fill underground voids created by the limestone mining operations of Linwood Mining and to also utilize the ash as paving material, aggregate and wall material. The DNR has determined on two occasions, most recently on October 28, 2004, that the use of the ash as a "raw material" in the bound cementatious product form and for these other purposes is a "beneficial use" under the Department rules, 567 IAC Chapter 108, and is, therefore, exempt from the Department's solid waste storage and disposal project permitting requirements.

Currently the company has obtained authorization to accept CCB from 13 utilities and businesses. As you are aware, the process to obtain authorization involves the testing of the ash to determine if it meets or exceeds statewide standards for certain metals and the maximum contaminant levels for drinking water. In the event that it exceeds any of those standards, AMSCO is required to obtain a variance which DNR has granted in all cases. In granting the variances, the DNR has determined that, as a result of this process, leaching does not occur and there is no threat to the groundwater or to the environment.

Since 1993, AMSCO has processed more than 1 million tons of CCB without incident. During this period AMSCO is unaware of any complaints regarding its operation from the public and has operated its facility without incident in exactly the manner which has

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received the DNR's approval, not once but twice, eleven years apart, most recently in October 2004. For this reason, AMSCO is very concerned about the amendments being proposed which could be interpreted to ban the activities of AMSCO as they are presently conducted.

AMSCO's comments regarding the proposed amendment to chapter 108 are as follows:

The AMSCO CCB Process

The use of processed CCB has been widely recognized as a safe and economical means of backfilling voids resulting from underground mining for many years. Unlike the traditional landfilling of CCB, AMSCO employs a unique method of processing CCB which differentiates AMSCO from other CCB handlers. This process, which is described in more detail below, ensures that the CCB upon placement in the Linwood underground mine, will have no present or future adverse environmental impact.

The Linwood Mine is a continuous underground mining operation. It is mined utilizing the "room and pillar" method which results in large underground voids in two "floors", 90 and 130 feet below the ground's surface. Linwood Mining has mined underground since the 1960's and currently mines approximately 32 acres a year. The structural integrity of the mine is dependent on the geology and deposition of the limestone formation. During the mining operation there may be areas where the geology (shale, sandstone) may not fully support the material above the mined out area. These areas pose a greater risk for collapse or subsidence. In fact, in 1993 an area of the Scott County landfill, operating above a mined out portion of the mine, subsided. Realizing the potential for this to occur in the future, the Department has authorized AMSCO to place processed CCB in the mined out areas, beginning with the areas underlying the landfill. This has successfully prevented a reoccurrence of the subsidence under the operating landfill.

As previously indicated, the Department has twice authorized AMSCO's beneficial use project. AMSCO has processed the CCB material in the manner allowed since its inception in 1993. That is, the CCB is processed and then gravity fed into mine rooms from the surface via an 18" hole. AMSCO continues to work closely with Linwood to determine mine reclamation locations for deposition of AMSCO's product.

The material has been and continues to be brought to AMSCO in pneumatic trucks. This material is either processed immediately in one of two plants or is transferred into portable storage containers called pigs, where it is held until it is processed, usually later in the day that it arrives. The entire process is enclosed and self-contained to eliminate the release of dust, ash, and process air and water into the atmosphere.

The CCB is mixed in the mill where water is added to make the material chemically react so it sets up in the mine. CCB materials are chemically active in the sense that the main constituents react over time with each other to form a hardened, structurally sound material. This reaction is responsible for the "encapsulation" action which

produces the physical strengths in the CCB after they have been "cured".

The material that comes out of the mill is monitored for appearance which is indicative of its reactivity; lime kiln dust can be added to the mixture to increase its reactivity so it sets up faster. The material sets up quickly and continues to strengthen over time. (See attached strength results.) The "cured" material has no appreciable water content; in fact when hardened it repels water, and it exhibits the strength to hold any matter that falls onto it from the ceiling of the mine, thereby preventing subsidence.

Beneficial Use

Approximately 90 million tons of CCB are generated annually by the electric utility industry in the United States. The major byproducts include fly ash (~54%), bottom ash (~16%), boiler slag (~7%), and flue gas desulfurization sludges (~23%). Of the amount generated, about 19 million tons are beneficially used; primarily fly ash as a Portland cement replacement in concrete and concrete products. Most CCB, the remaining, about 71 million tons, is disposed of in impoundments and landfills and is put to no use whatsoever. It is clear that the processing of the CCB by AMSCO is beneficially impacting the local environment by ensuring the continued integrity of the Linwood Mine and is removing CCB from the waste stream. In addition, there is no evidence to indicate that this practice has or will impact the groundwater. A study of a similar project in Indiana demonstrated that, when it is in its liquefied state, the lava-like flow of CCB does not mix with water but rather displaces it. (This Indiana project, unlike the AMSCO/Linwood Mining project, involved the placement of the CCB mixture in waterfilled underground mine cavities.) In addition, the short term results indicate no discernible chemical effects from CCB on mine water and no chemical effects on the surrounding ground water.

AMSCO is committed to continuing its practice of managing the CCB which it accepts for processing in a manner which will result in no harm to the environment and looks forward to working with the Department in the future to continue this valuable use of this byproduct.

In conclusion, AMSCO would like to emphasize the following comments:

- AMSCO and its operation are different from all other uses of CCB that are intended to be addressed by the revised Chapter 108. AMSCO does not merely "dump" the CCB which it receives. It processes it in a manner which is completely self-contained, encapsulates the CCB, and methodically places the processed material underground.

- The purpose of AMSCO obtaining and processing the CCB and the use to which it is put is a true beneficial use. The backfilling of the Linwood underground limestone mine minimizes the potential for subsidence, a true benefit to the surface environment. Other CCB handlers are merely filling in surface holes which may not become beneficial until the "hole is completely filled" and that

surface can be utilized for some other activity. Backfilling of underground mines utilizing CCB is a practice which is recognized throughout the country and by EPA.

- AMSCO employs unique practices and measures which ensures that its operations will have no adverse environmental impact. These include the closed transportation of the CCB, the fully self-contained process which "encapsulates" the CCB, and the monitoring of mine discharge water through an NPDES permit.

- The Department operates an area ambient air monitoring station (Buffalo, Linwood Mining) located approximately 1000 – 1500 feet from AMSCO's operation. That station has not had an exceedance in the past three years.

- The Department has determined on a number of occasions, through the variance process, that the properties of the fill material, its leachate characteristics and strength, are protective of the environment

- The Department has reviewed and scrutinized the AMSCO operation, upon startup in 1993 and most recently in October 2004, and both times granted their approval to operate.

- Linwood Mining is subject to mine reclamation regulations under Iowa Code section 208.17 which obligate Linwood Mining to ensure that its mine is stabilized and requires a bond to assure that reclamation of the mine is completed.

Based upon the information and comments presented about, AMSCO recommends that mine backfilling in the manner conducted by AMSCO be specified in the new Chapter 108 as a beneficial use application under 108.4(4) "a" and "b".

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Vice President, Sales

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Project: Scott Co. Landfill/Linwood Mine

To: AMSCO
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Attn: Tim Walsh

Lab No. 040239

Date: 5/28/04

Tests On: Grout Samples
Submitted By: Lab Rep
Date Received: 5/14/04 Dates Tested: May By: CAC/DPL

Unconfined Compressive Strength

Two containers of dry "ash" powder were received from AMSCO on May 14, 2004. The first container was unmarked and the second container was marked "mixed". AMSCO requested that laboratory batches be made by adding water to form a slurry, and that the slurry be cast into 2-inch diameter by 4-inch high cylinder molds for compressive strength testing after aging in the molds for 7 and 14 days.

The separate ingredients and the ambient temperature were approximately 70° F. The slurry temperatures increased to approximately 115° F after the mixing water was added. Approximately 30 minutes after the water addition, the temperature began to decrease. The flow for all mixes was 8 inches. The flow was determined by filling a 3-inch diameter open-ended cylinder with slurry to a height of 6 inches and subsequently lifting the cylinder to allow the slurry to gently flow into a circular pool 8 inches in diameter.

Unmarked Powder:
Specimens marked "1-A" were made with a 0.68 water:powder ratio (by weight). Specimens were cast shortly after adding the mixing water. Specimens marked "1-B" were made with a 0.79 water:powder ratio and specimens were cast after the mix temperature began to drop (after 30 minutes).

Powder Marked "Mixed":

Specimens marked "2-A" were made with a 0.63 water:powder ratio. Specimens were cast shortly after adding the mixing water. Specimens marked "2-B" were made with a 0.68 water:powder ratio and specimens were cast after the temperature began to drop.

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Following are the results of unconfined compression tests performed by ASTM D2166. Results are in pounds per square inch.

Cylinder No.	7-Day	14-Day	Cylinder No.	7-Day	14-Day
1-A	138	530	2-A	58	265
1-A	133	545	2-A	55	295
1-A	147	510	2-A	55	250
1-B	70	160	2-B	63	255
1-B	79	270	2-B	58	250
1-B	96	225	2-B	52	240

Respectfully Submitted,
American Testing and Engineering

Craig A. Carradus, PE

2 xc above